Minutes of the April 20 and 21, 2004
WSR-88D System Recommendation and Evaluation Committee (SREC) Meeting

Before the opening session of the SREC, the NEXRAD Employees Association organized a tribute to Tim O'Bannon. Tim's wife, Joan, and son, Isaac, participated in the ceremony which culminated in the unveiling of a framed painting of a wildlife scene and an inscription commemorating Tim.

Opening General Session, 20 April.

The following personnel were named as the agency participants for the SREC:

SREC Chairperson	Rich Vogt
SREC Executive Secretary	Tim Crum
NWS Voting Member	Mike Istok
NWS Alternate Members	Chris Dietz and Pete Pickard
DOD Voting Member	Mike Spaulding
FAA Voting Member	Dennis Roofe
FAA Alternate Members	Bill Bumgarner and Tom Jenkins
NPI Project	Greg Cate and Roger Hall
ROC Support Staff	Cheryl Stephenson, Bill Armstrong, Mark Fresch, Major Mike Miller

The participants in the remainder of the SREC meeting are listed in Attachment 1.

The general session consisted of a series of invited topics and technical summaries of proposed algorithms and changes. The briefing slides and the technical summaries were documented in the SREC Algorithm Process Checklist the presenters provided in advance and posted at: ftp://ftp.roc.noaa.gov/Pub/Srec/SREC0404 in lieu of briefing slides. Below is a brief summary of the presentations and discussions that ensued.

1. Review Open SREC Meeting Action Items. Many action items were flagged for discussion and closure during this review. The action items in Attachment 2 are the ones from previous meetings open at the start of this SREC and the new action items assigned during this meeting. Tim Crum will provide the SREC members and action officers periodic updates on the status of the action items. When action officers close an action item, please send a copy of the closure information to Tim.

2. Dr. John Snow, University of Oklahoma and NEXRAD Technical Advisory Committee (TAC) Chairperson, provided a summary of the 30 and 31 March 2004 NEXRAD TAC meeting. The TAC recommends the implementation of SZ-2 phase coding on elevation angles at or below 1.5 degrees be targeted for the first ORDA enhancement build after ORDA deployment subject to: the ROC develop and execute a test plan for SZ-2 implementation similar to SIGMET/GMAP test plan. The TAC recommends a phased approach to implementing super resolution data the ORDA enables: super resolution data at or below 1.5 degrees (due to problems in collecting these data in batch mode). However, the TAC recommends the ROC work with OS&T to better quantify the benefits of using super resolution data in operations. In addition, the ROC needs to assist downstream users prepare for the new data streams by providing examples of the new data. The TAC looks forward to reviewing the ROC's final report evaluating the SIGMET GMAP performance. The TAC was surprised at the reported

small performance increase of the Range Correction Algorithm/Convective-Stratiform Separation Algorithm (RCA/CSSA) based on results presented.

3. Greg Cate, NWS Office of Science and Technology (OS&T) NEXRAD Product Improvement (NPI) Program. ORDA Project Schedule and Status. Greg announced the recommended 5-month slip of the ORDA schedule, subject to NPMC approval at the June 2004 NPMC meeting. One result of the delay will be the use of a Sigmet 72 MHz, available by August 2004, vice the 36 MHz processor. The ORDA deployment is scheduled to be 14- 16 months long and begin at the end of February 2005. The ROC subject matter experts (SMEs) are working with the ORDA Team to perform analysis of ORDA radar parameters, GMAP performance, and will execute the tests the contractor writes. The ORDA Project is planning possible temporary deployments of a portable ORDA (porta ORDA) to select sites with different clutter regimes in September/October 2004. Greg also provided an update on the Dual Polarization Project which is in Phase 1 – defining requirements, completing the program plan/acquisition plan, and developing the statement of objectives for the contract. Deployment is targeted to start 4FY07. NPMC approval to proceed at key milestones will be required.

4. Steve Smith, ROC Software Engineering Team. RPG System Usage Tools and Build 5 Full-Load Results and Usage Projects. Steve reported on a full-load test executed during the Build 5 System Test intended to emulate a worst-case load. Some felt the test was designed to stress the system to just under the breaking point and exceeds operational worst case scenario loading. Discussions during the presentation revealed a need to redefine the full-load tests. (Action Item 0404-1) For the legacy system, adding users did not add much system loading. However, in today's environment users are asking for many more different products. The SREC asked software engineering to provide the details of the full load information provided in Steve's presentation (Action Item 0404-2). The SREC asked for the system load added from Build 4 to Build 6, relative measures, are acceptable (Action Item 0404-3). In the OS32 environment, the ROC had to optimize software before implementation due to scarce system resources. Bill Armstrong stated that ORPG software is not optimized while meeting the 6-month software release cycle. For example, the Snow Accumulation Algorithm (SAA) will be executed all the time at all sites in order to provide a snow product for users. Trimming back on the algorithm generation based on season and location could reduce system usage. The Radar Echo Classifier (REC) and SAA can be optimized, but these would be major efforts on the part of ROC Software Engineering. Steve's finding is that the RPG is nearing capacity in Build 6. The projected task reserve is three additional tasks similar to the REC usage. RPG Build 9 will be a logical time to add the new RPG processor/replacement. If the same operating system is chosen, the amount of testing could be reduced as much as 3 months and the system test could be less rigorous than with a transition to LINUX. Software Engineering provided the SREC three documents associated with the topic of system usage:

a. ROC White Paper on the Port of the Operational RPG to a PC/LINUX platform.
b. RPG Line Rate/Utilization Information
c. Report on RPG System Utilization Tools

5. Don Horvat, ROC System Engineering Team. Software changes required

by upcoming hardware changes, including RPG distributed processing. Software changes are needed for the power administration upgrade, digital input/output card abandonment and upgrade of the RMS interface. In regard to the RPG processor upgrade, Don stressed the need for increased reliability (with respect to the RPG Ultra 10) and a need for a common operating system. The Ultra 10 is memory constrained, but it is not cost effective in view of obsolescence to add more memory to them. The replacement RPG may have 1 GB – 2 GB of memory. The added memory will increase throughput and decrease IO. Rex Reed reported that a white paper on the RPG replacement is circulating through ROC Engineering. When the paper is released, it will be a part of the business case for the need of an RPG processor replacement presented to the triagencies within 3 months. The SREC members requested a copy of the paper when it is completed (Action Item 0404-4). The platform decision milestone date is TBD, but within 6 months. There is also consideration of moving the BDDS functionality to the new RPG.

6. Bill Armstrong, ROC Software Engineering Team. Status Update of RPG Build 5 and 6. The Build 5 deployment began on schedule in late March. There are 115 CCRs implemented in RPG Build 5 and 30 in OPUP Build 5. System testing for RPG Build 6 began on 9 April. The engineering drop of Build 6 for the ORDA and OS&T has been made. Over 100 CCRs are in RPG Build 6. Over 70 CCRs are in OPUP Build 6. The respective RPG and OPUP change content is the largest of the six-month software workloads.

7. Major Mike Miller, ROC Operations Branch. Build 5/New VCP Status Update. Major Miller briefed the SREC on some of the problems encountered with Build 5 and the new VCPs. At some sites AU2 Parity Errors occur, Pedestal Dynamic Faults occur, the use of exclusion zones is required at some locations to remove excessive precipitation accumulations near the radar, and data quality/clutter issues at some sites with the use of VCP12/121. The ROC has staff addressing the data quality issues and some changes in Build 6 will help mitigate others.

8. Agency Perspectives on Build 7 and Beyond

a. DOD. Mike Spaulding, DOD NEXRAD Program Manager. Mike stated the Air Force point of view is that any changes fielded not decrease the reliability of the system and make every effort to improve the maintainability of the system. The Air Force has concerns about the continued 6 month software builds while installing hardware modifications which increase testing requirements, support requirements, and the possibility of problems we have not anticipated.

b. DOT. Bill Bumgarner, FAA NEXRAD Program Office. Bill presented an update on several FAA projects that will lead to future considerations for RPG and RDA enhancements. The FAA is switching from Product 67 (layered composite SFC – 24,000 ft with anomalous propagation (AP) removed) to Product 65 (same product, but with no AP removal). 10 ITWS and 3 MIAWS are installed. The FAA is planning a transition to digital communications (FTI) to support Weather and Radar Processor (WARP), Integrated Terminal Weather System (ITWS) and Medium Intensity Airport Weather System (MIAWS). The operational version of the Corridor Integrated Weather System (CIWS) may also use this communications network. The FAA will hold a TIM at the ROC on 5 May on their

communications upgrade plans. The FAA seeks a transition to a faster RPG, faster radar scanning, and improved data quality and radar outage notification procedures. Bill has been involved in trying to get automated switching from precipitation VCPs to clear air mode and improving the precipitation detection function. Bill laid out possible discussion topics for the next 3 SRECs dealing with VCP12 usage and ORDA initial and enhancement builds. The FAA emphasized that ORDA enhancements should be controlled and implemented as a ROC maintenance function using O&M funding and not under a direct OS&T contract with RSIS using NPI funding.

c. DOC. Mike Istok, NWS OS&T System Engineering Center (SEC). Mike stated the NWS is pleased with how the RPG upgrades are proceeding. The NWS list of desired products has not changed since the October 2003 SREC and understands the realities of the ORDA Project may require changing targeted RPG builds. The NWS is conducting tests of heavy VCP12 usage on the NWS infrastructure. There is still concern on the load on the Central Server. At this point the SREC members agreed to recommend keeping VCP21 as the default precipitation VCP, but to continue to review this decision at every SREC. Mike also had suggestions on how to gain better measures of WSR-88D output and network operations. Mike listed the primary projects the OS&T System Engineering Center are working on: RCA/CSSA (OHD), storm cell identification and tracking (SCIT) Filter, Mesocyclone Detection Algorithm, NWS use of TDWR data, and CODE updates. AWIPS OB6, September 2005 release, will be able to display Super Resolution WSR-88D data. The AWIPS Program needs sample data and ICDs. Mike listed the following future enhancement ideas: provide 2D feature data and Rapid Update for SCIT; add past/future positions and motion data for TVS; apply data quality control to SuperOb input data (AP and clutter removal); add a filter to REC to reduce noise and allow better use by EPRE; and a uniform winds algorithm, similar to Velocity Azimuth Display (VAD) but smaller sectors.

d. NPI. Greg Cate, NWS OS&T NPI Program. Greg recommended the ORDA deployment be linked to RPG Build 7 and recommended minimizing Build 7 content to reduce risk and test bed antenna contention. Rich Vogt suggested breaking the implementation of super resolution products (0.25 km reflectivity and 0.5 degree azimuthal sampling) into separate builds based on the TAC recommendations and impact on RPG system capacity. The NPI Program needs to be able to state the gains expected from the 0.25 km reflectivity data implemented alone. (Action Item 0404-6)

e. ROC Perspectives. Bill Armstrong, ROC Software Engineering, presented an overview of some of the projects, improvements, and issues ROC Software Engineering will address in the next few builds. For Build 7, changes to the RPG software should be limited due to ROC support requirements for the ORDA Project and a few changes that will require a minimum of test bed antenna time to test. He further recommended a flexible approach to the next three builds (i.e., some RPG Build 8 analysis and change implementations may be worked in the background during the Build 7 cycle when time permits). Bill then listed some of the changes the ORDA requires and some non-ORDA corrections needed (low risk and effort) for Build 7. Bill also listed specific items for

builds 8 and 9 which were discussed in the executive session, including the RPG replacement project for Build 9.

Summary of technical discussions on new science ready for RPG implementation.

1. Chris Dietz, NWS Office of Hydrologic Development (OHD). Range Correction Algorithm (RCA) & Convective Stratiform Separation Algorithm (CSSA) Project Status Briefing. Chris said the NWS is targeting Build 8 for implementing these algorithms. The OHD is planning a multi-site field evaluation for this summer and results will be available for a summer 2004 TAC meeting. The RCA/CSSA results OHD showed at the March TAC were only from the Sterling, VA WSR-88D. The ROC Applications Branch is providing IV&V on the CSSA. The ROC will assist OHD by providing recommendations on how the algorithms can be optimized. (Action Item 0404-5) The OHD is working on a concept of operations document. Chris had a slide that showed a worst case of RCA/CSSA system usage stats using a Blade 2000 with 5GB of memory. OHD needs to know what are the acceptable system usage values. OHD may have to redo the science if they cannot achieve the performance required. (Action Item 0404-9) ROC software engineering needs the distribution of system usage during a volume scan. They can obtain this by running a local version of the RCA/CSSA software.

2. David Smalley, Lincoln Laboratory. Super High Resolution Data Impact. The FAA would like to obtain 0.25 km reflectivity data and 0.5 degree sampling at the same time. Otherwise, they will need to make software changes and revalidate results. The Data Quality Assurance Algorithm (DQA) will benefit from the super resolution data. The super resolution data is closer to the resolution of the Terminal Doppler Weather Radar (TDWR) data that the MIGFA has been tuned for. Dave discussed the CIWS AP clutter and “lint” (caused by point targets) removal algorithm. They expect to see more lint with super resolution data. At the fall 2004 SREC meeting Lincoln Labs may be ready to add the lint removal capability to the DQA.

3. David Smalley, Lincoln Laboratory. Machine Intelligent Gust Front Algorithm (MIGFA). David Smalley briefed the FAA/Lincoln Labs continue to plan to implement MIGFA in two phases (as early as Build 8 and Build 9). Lincoln Lab is performing more MIGFA algorithm field testing at their 8 sites to further tune the parameters and develop the product. Lincoln Labs plans to go to the fall TAC meeting to show validation data. The present performance is better than last fall’s version, but not as good as Lincoln Labs wants. So, there is work yet to do and TDWR MIGFA people will be working on the WSR-88D version. The MIGFA will be able to use super resolution data, however, the possible restriction of super resolution data to split cuts could require them to make software changes. In response to questions, Dave stated that MIGFA is now able to run with VCP12 data and has resolved the earlier-reported problem with volume restarts.

4. Greg Cate, NWS OS&T NPI Program. Super Resolution Data. Greg Cate stated the super resolution products would not be added to the baseline until the first software release beyond the initial software release (a risk reduction effort). A phased approach of implementing new science is likely. Implementing 0.25 km reflectivity alone may be an option. The 1 km reflectivity data must be retained until data quality improvement techniques (whitening) come online. There are still options

for whether to send one data stream or two data streams (one high resolution and one super resolution). Even though NSSL tests have shown very little difference between the legacy 1 km reflectivity data and the results of algorithms using recombined 1 km data, the results need to be validated by the TAC. (Action Item 0404-7) The FAA would like to see the distribution of range gate reflectivity values for >30 dBZ and <30 dBZ. Greg will develop a matrix of options/impacts, advantages/disadvantages, costs, and timelines for the super resolution data.

5. Mike Istok, NWS OS&T SEC. Filtered Storm Cell Identification and Tracking (SCIT) Algorithm. Mike briefed the NWS targets this new algorithm for Build 8 and could implement as early as Build 7. The algorithm has received a TAC recommendation for implementation. OS&T SEC is analyzing the Segments task and may recode in 'C.' (Note after the SREC: The results of the OS&T analysis are that the segments Fortran code is very efficient and reliable and their change only requires minor modification to the Fortran code. There may be a small maintenance benefit (i.e., less Fortran code) of rewriting in C, but the RPG still has a lot of Fortran which works fine, and rewriting in C would increase risk of introducing "bugs.")

6. Mike Istok, NWS OS&T SEC. Phase 3 Mesocyclone Detection Algorithm (MDA), Near Storm Environment. Reference AI 0403-13, closed, the triagenices need to remember to make a decision on when to delete the legacy mesocylone algorithm from the baseline. We are keeping both for an interim period to aid the forecasters in the transition to the new algorithm. The downstream users will need to transition to using the new MDA versus the legacy mesocyclone algorithm at that point. AWIPS OB4 is the first load to display the new MDA (beta test starts in August 2004). WARP will not display the new product. The OPUP will have the display capability in Build 7.

7. Mike Istok, NWS OS&T SEC. AWIPS – RPG Interface. These changes will increase the number of products AWIPS users can request from the RPG they are associated with (i.e., increased Radar Product Request list). This change will also allow more "One Time Request" permissions thereby enabling neighboring AWIPS to request additional radar products (that are in the RPG product data base). These capabilities are needed to enable weather forecast offices (WFOs) to receive the products they need (e.g., more of the rapid update products) to support forecast and warning operations. Earlier work is in Build 6, Digital Hybrid Reflectivity and the high-resolution products will be compressed before transmission from the RPG. This could result in even more product generation requests. The rapid update products, each elevation, counts against the product limit. OS&T SEC is analyzing extending the AWIPS wide area network (WAN) to DOD and DOT sites. The CIO is looking at a communications architecture that will be unified rather than the various sub networks in place now.

6. Randy Steadham, ROC Applications Branch. Automated Volume Coverage Patterns (VCPs). This project has the goal of optimum use of VCPs, easier operator control of VCPs, ultimately "smart" VCP automation. They would like to implement the improved precipitation detection function (PDF) (automatically switches the radar back to clear air mode after an adaptable period of time) in Build 7. Two PDFs are being investigated – one uses hybrid scan reflectivity (HSR) as input and the

other uses DQA.

7. Dave Zittel, ROC Applications Branch. Status of Snow Accumulation Algorithm (SAA) and Products. The SAA is on track for implementation in Build 6. OPUP will be able to display the 6 SAA products. AWIPS will be able to display the products beginning in mid 2005. However, the data levels implemented may not be appropriate for all snow storms. For example, the Storm Total Snow Depth has a maximum value of 30 inches. There are two basic paths for resolving this issue: change the HCI (will take a lot of software time) or generate digital high-resolution products and let the users determine their display. Further work on determining the approach to follow will be done.

8. Lynn Allmon, ROC Hardware Engineering Team. RV Mitigation, SZ-2 Implementation in Particular. Lynn presented results of a RV Mitigation Workshop which addressed multiple pulse repetition frequency (PRF) Dealiasing Algorithm (MPDA) and ORDA options (phase coding the multiple PRT). Both phase coding and staggered PRT have an advantage over MPDA. The SZ-1 and staggered PRT approaches are not mature enough to implement. However, SZ-2 appears promising as a new range unfolding technique at the split cut angles – retain surveillance cuts and replace Doppler cuts with SZ-2. The remaining elevation angles would be unchanged. SZ-2 is compatible with frequency domain filters as the legacy system has. What SZ-2 is not compatible with is the 5-pole elliptical filter used in the legacy system. SZ-2 and GMAP are compatible. The TAC will give a final implementation recommendation after seeing SZ-2 results after being run on “real” data and comparisons with VCP121 results. This is similar to the TAC recommendation in regard to GMAP. The ROC is ready to begin SZ-2 production coding. The SREC will need to consider whether to leave VCP121/MPDA and SZ-2 in the baseline. There are a lot of issues to be resolved, including how to implement to preserve the ability to run VCP121, though the ORDA solution is a good candidate to replace MPDA. Staggered PRT helps at mid and high levels, but is not mature yet according to researchers.

9. Christina Horvat, ROC System Engineering Team. Adjust Software Build Schedule to Align with quarterly Harris STAT Scans. Christina explained that this tool is used to identify system vulnerabilities and provide quarterly reporting as required by the NOAA security policy. The result is to reduce security maintenance casts by identifying vulnerabilities in advance and providing information on how to patch or update configurations. We can run the scan on all field systems or at the ROC. We are doing more network connectivity and moving from X.25, resulting in more security requests. Most discussion was on the quarterly requirement and needing time to test and add patches. Christina will ask if we can be waived or deferred until the next release. (Action Item 0404-10) The Secure Shell in Build 6 was added for the Harris scanner. The SREC agreed with Christina’s recommendation to move the normal software release dates back 30 days to the end of April and October so that if any patches are needed as a result of the 15 March and 15 September scans, they can be integrated in time for the end of October and April release dates. Christina summarized by stating this requirement will likely result in two additional security patch releases each year, in addition to the planned software releases.

10. Christina Horvat, ROC System Engineering Team. WSR-88D Software Changes Required Due to Security Policy Changes. Christina overviewed

the security change planned and targets from Build 6.1P through 9.0P; and security policy having present and future software impacts. There will be Sun recommended patches, Harris STAT Scans, DOD required security implementations, new requirements based on WSR-88D connections to NWSNet, and potentially other new directives/requirements.

11. Jose Marcos, FAA HQ. Distributing NEXRAD Products to FAA Systems. Jose's presentation focused on the FAA plans for changing the approach to distributing WSR-88D products. Faster VCPs, obsolescence of X.25 equipment are driving the need to upgrade FAA communications. In addition, the FAA seeks to minimize the costs of future FAA weather systems to access WSR-88D data. The FAA has selected multicast as the long-term solution. The standard Class 1 TCP/IP WSR-88D ICD will not apply, though the FAA will try to minimize the number of changes. New hardware will be required on the WSR-88D side of the interface (upgrade a card on the router that is maxed out and a port that is not available is needed. The X.25 connections for ITWS and MIAWS will remain – may be a staged transition. The FAA is targeting Build 8 or Build 9 for this modification. Jose has already scheduled technical interchange meetings (TIMs) with the ROC to define technical solution and engage development teams (FAA Product Teams and ROC).

12. Sallie Ahlert, ROC System Engineering Team. Software Support for Communications Changes. Sallie provided an overview of the comms changes needed in builds 7 though 9, other possible comms changes not clearly build targeted, and build independent changes. Changes include those required for ORDA, expand class of user definition, conversion of the AWIPS dedicated connections to digital service, FAA multicast, console server replacement, migration to Ipv6, increased RPG data flow increases, possible elimination of MLOS from baseline, conversion of NWS private T1 connections to fiber, and legacy PUP disposal.

Closing Executive Session, 21 April.

This executive session had the following goals:

1. Approve the minutes of the October 2003 SREC meeting;
2. Develop Recommended OPUP and RPG Build 7 Content and Release Date;
3. Develop Recommended RPG, OPUP, and ORDA Targeted Contents and Release Dates For builds 8, 9, and 10; and
4. For SREC Voting Members Only: Review of Data Quality MOAs (Completion of this objective was delayed due a shortage of meeting time.)

The following personnel were named as the agency participants for the SREC:

SREC Chairperson	Rich Vogt, Tim Crum designated as chair for this session
SREC Executive Secretary	Tim Crum
NWS Voting Member	Mike Istok
DOD Voting Member	Mike Spaulding
FAA Voting Member	Bill Bumgarner
NPI Project	Greg Cate
ROC Support Staff	Cheryl Stephenson, Bill Armstrong, Mark Fresch, Major Mike Miller

The SREC approved the 19 April 2004 version of the minutes from the October

2003 SREC meeting which had been distributed earlier.

The first focus of discussion was how RPG Build 7 can best support the remaining ORDA development work and deployment. The ORDA requires Build 7 for deployment, including the planned deployment of a "Porta ORDA" on November 29, 2004 at the Norman, OK WFO. The SREC members agreed having RPG Build 7 ready to deploy with the Porta ORDA to the first beta site was the best strategy. Having Build 7 ready for beta test at the end of November will reduce the Build 7 integration time even more, thus another reason for the relatively small number of changes in Build 7, especially those that cannot be tested as part of the ORDA System Test. If problems are found during the Porta ORDA/Build 7 beta test, the Porta ORDA connections can be removed while corrections to Build 7 software are made and Build 6 is reloaded on the RPG to support operations or if the ORDA software has a problem, Build 7 can remain on the RPG or Build 6 can be reloaded. The 6-week ORDA beta test is scheduled as follows:

Beta Test #1, install ORDA at two sites beginning on 10 January 2005
Beta Test #2, install ORDA at three sites beginning on 24 January 2005

Mike Spaulding agreed we could decouple the OPUP Build 7 release to field sites from the RPG Build 7 release if that will ensure lower risk for the ORDA deployment.

Using lowering RPG Build 7 and ORDA test bed and test resource contention as the guiding principal, the SREC members approved the following RPG Build 7 contents for recommendation to the NPMC. The SREC further recommend the RPG Build 7 be moved up one month from its "normal" release date to correspond to the month-earlier beta test start date. If the ORDA schedule slips, the SREC will likely recommend a corresponding slip in the Build 7 release date. The SREC members recommend the targeted release contents of RPG and RDA builds 8 - 10 as shown in Attachment 3. The SREC members recommend following release contents for RPG Build 7 with deployment scheduled to begin 2/28/05:

TITLE	REQUESTING ORGANIZATION
Changes to Support RDA Development and Deployment	NPI*
Refine RPG Adaptation Data for Improved Efficiency And Long-Term Maintenance (Reduce Work Load on Field Sites)	ROC
Add Frame Relay to Remaining DOD and NWS Sites	NWS*
AWIPS – RPG Interface	NWS*
Security Updates	ROC*
General Software Maintenance for Significant Issues	ROC

Note:
"*" Indicates a programmatic dependence by another project(s)

The SREC recommends the following contents for Open PUP Build 7 and a release date to the field beginning 31 March 2005:

- Decompression software for high-resolution products and
- Display of new Mesocyclone Detection Algorithm.

Below is a short summary of the major discussion points raised during the executive session.

1. Build 7. Bill Armstrong confirmed that RPG Build 7 will work with

the legacy RDA and the Open RDA. The initial Open RDA software, Build 7, essentially replicates the legacy RDA capability.

2. The due dates for the Build 7 and Build 8 integration items, based on the SREC recommended release dates of 28 February 2005 and 31 October 2005 respectively are as follows:

Build 7
- Final Changes to ORDA – RPG ICD Delivered By 4/30/04
- Start of System Test – 7/26/04

Build 8
- External Organizations Deliver Build 8 Software to ROC By 1/31/05

3. The SREC recommends a release data for Build 8 of 31 October 2005. This is in accordance with the ROC Information Technology Security Officer (ITSO), Christina Horvat, recommendation to better align the WSR-88D software releases with the Harris Scan.
4. The SREC targeted contents and release date for Build 9 is based on the assumption the replacement RPG hardware and Build 9 software are released together.
5. The FAA prefers GMAP filtered data vice a second data stream, nationally filtered, assuming the GMAP meets requirements.

During the discussions of the contents of builds, the following were assumed or considered:

1. Assume Build 9 software and RPG replacement hardware will be deployed at the same time.
2. The Build 8 targeted contents considered the RPG CPU limitations, the need for further SZ-2 algorithm validation, and assumed the recombined 0.25 km reflectivity data would not negatively impact the legacy RPG algorithms using the 1 km data.

Second, and final, Closing Executive Session, 17 May.

This closing executive session had the following agenda items, primarily based on Review of Data Quality MOAs (Completion of this objective on 21 April was delayed due a shortage of meeting time available.):

1. Review of ROC managed NSSL MOUs by Mark Fresch;
2. Review of NPI managed NSSL MOUs by Greg Cate;
3. Review of NCAR - NSSL Data Quality MOU by Lynn Allmon;
4. Voting member discussion of recommendation to present to NPMC;
5. Voting member discussion of recommended close out of NPMC AI ACTION ITEM 3-3.2; and
6. Any items the SREC members may want to raise.

The following personnel were named as the agency participants for this session of the SREC (beyond presenters):

SREC Chairperson	Rich Vogt
SREC Executive Secretary	Tim Crum
NWS Voting Member	Mike Istok
DOD Voting Member	Mike Spaulding
FAA Voting Member	Dennis Roofe

NPI Project	Greg Cate
Support Staff	Bob Saffle and Bill Bumgarner

The following MOU manager presentations were made:

1. Greg Cate, NWS OS&T NPI Program. NWS OS&T and NSSL MOU. Greg overviewed the main MOU tasks: over sampling and whitening, benchmark time series data sets, full power spectrum processing, X-band dual polarization radar system, dual polarization, and super resolution data (0.25 km reflectivity and 0.5 degree azimuthally sampling). The presentation included information on current work, planned efforts, and how the work is being coordinated with the ROC. Rich Vogt stated that OHD has started a dialog with NSSL for the dual pole science in regard to rainfall estimation. Displaying dual polarization data on AWIPS is a needed goal. Bob Saffle stated that looking at dual polarized data will be like looking at a new radar. Mike Istok requested Greg's priority list on the Gant Chart and the list of dependencies. (Action Item 0404-11) Greg Cate stated Chris Curtis, NSSL, will be looking at over lapping sampling and will be requesting ROC assistance. Greg requested Bob Saffle's opinion on the use of full power spectrum processing. The SREC was comfortable that the appropriate coordination between the ROC and NPI MOU efforts is in place and the NPI MOU efforts are proceeding toward operational use. The SREC asked Greg to follow up on the TAC recommendation for optimum calibration techniques (i.e., a cross check between the vertical calibration the S POLE radar uses and the NSSL 20 degree approach. (Action Item 0404-12) The NSSL will provide a schedule for the development of first phase of range over sampling technique, without whitening; and development of a second phase of range over sampling with whitening. (Action Item 0404-13) The SREC members along with the TAC are interested in understanding the impacts of the apparent 3 dB loss of sensitivity with dual polarization. The SREC was assured that the loss is not greater than 3 dB. Research will be needed to determine if a lower SNR can recover some of this loss.

2. Lynn Allmon, ROC Hardware Engineering Team. Range – Velocity Ambiguity Mitigation MOU. Lynn reviewed the history of this work dating back to 1996. The primary deliverables from this MOU have been the SZ-2 and SZ-1 algorithms; recommendation to use SZ-2 at the lowest two elevation angles and SZ-1 at higher angles up to 16.7 degrees, collected Level I data, validated censoring methodologies for phase coded data, quantified performance of RV algorithms, and implemented S-Pol RVP8 and RV mitigation algorithm for validation tests. The recent deliverables of this MOU have been needed in order to move ahead on several data quality issues. Planned work includes: RV algorithm modification report, staggered PRT algorithm, and report on SZ-1 comparison study. ROC engineering work of transferring the results will be coded for use on the RVP8. Lynn Allmon stated that TAC, SREC, or other triagency members seeking the Level II data created from the MOU work should contact Bob Lee, Applications Branch. The group plans to test the ORDA and corresponding KTLX data; begin collecting full SZ2 VCPs in fall 2004; and begin collecting GMAP VCPs soon.

3. Mark Fresch, ROC Applications Branch. NSSL – ROC Technology Transfer MOU. Mark overviewed in detail the 8 tasks of the NSSL – ROC MOU. The agencies requested an agency-by-agency break out of the MOU costs. (Action Item 0404-14) The agencies also requested the long-term plan for the cross-radar correlation program (to identify potential data

quality/calibration issues). (Action Item 0404-15) The SREC members recommend the Applications Branch send the results of the ORDA super resolution evaluations and human-determined severe weather circulations in legacy versus recombined base data to the TAC for evaluation. Mark stated the NSSL is doing a good job of providing deliverables in a high quality and timely manner. Mark agreed to provide the SREC with an initial list of MOU projects by 6/15, a full MOU by 7/15, enroute to having the MOU signed by 8/15. SREC comments will be solicited.

The SREC also considered the wording of NPMC AI Action Item 3-3.1 in regard to obtaining a TAC validation recommendation on new algorithms and products.

During the August 2003 NPMC meeting a question and discussion arose concerning: (1) the amount of algorithm and product performance validation that is performed before insertion into the WSR-88D baseline; and (2) the existence of documentation of this validation information.

> The NPMC tasked Tim Crum (NPMC3-3.1 action item) to develop and coordinate a decision paper for NPMC consideration during the November 2003 NPMC meeting that address: how to ensure algorithms/products have adequate validation and that is documented.

Tim Crum coordinated a decision paper in February 2004 with the focal points. However the NPMC members did not concur with the staff's recommendation. The difference of opinion was in regard to: The recommendation states that "new and significantly revised (as determined by the SREC members) algorithms and products be evaluated by the TAC." We believe that this evaluation should be completed for "new or revised algorithms." The recommendation as worded leaves a potentially large and subjective decision to be made on whether or not a change to the software baseline needs to be evaluated by the TAC. Even minor algorithm changes can have significant effects on performance and all should be evaluated prior to inclusion into the baseline.

The SREC members agreed to not go the NPMC members on this issue unless as a "last resort." The compromise position is to recommend the NPMC adopt the following language for inclusion in the next SREC charter update and to close the NPMC action item:

> The SREC will determine which algorithms and products should be evaluated by the TAC. The SREC will consider the TAC evaluations along with any other "scientific readiness" inputs when recommending algorithms and products for inclusion in a particular NEXRAD software release. The TAC evaluations and other validation documentation will be included in the Configuration Change Request (CCR) kept at the ROC.

Follow-up discussions and summary points.

1. MOU review presentations need to focus more on the future plans.

2. The SREC needs to be aware of WSR-88D data quality data efforts the FAA Aviation Weather Research Group is performing. Bill Bumgarner stated the FAA NEXRAD Program Office is still trying to involve the Aviation Weather Group.

3. The SREC needs to revisit the proposed FY05 MOUs by mid July.

4. The SREC believes the MOU presentations demonstrated complementary work and work migrating to operations, discussion helped reinforce the coordination among the groups, the SREC members will review draft MOA annual updates and the SREC recommends the NPMC continue supporting data quality MOUs and annual SREC review of progress and plans.

People Attending/Participating in the
April 20 and 21, 2004 SREC Meeting

FAA
Courtenay Clifford
Tom Jenkins
Bill Bumgarner
Cam Tidwell
Jose Marcos
Jim Stobie
Ralph Quallich
Dennis Roofe

NWS
Greg Cate
Roger Hall
Cee Cee Hennigh
Pete Pickard
Mike Istok
Dennis Miller
Melanie Taylor
Brian Klein
Christine Dietz
Warren Blanchard
Eric Howieson
Ning Shen
Yukuan Song

DOD
Mike Spaulding

ROC
Rich Vogt
Mark Fresch
Tim Crum
Cheryl Stephenson
Major Mike Miller
Rex Reed
Doug Martindale
Zack Jing
Randy Steadham
Bill Armstrong
Ed Berkowitz
Don Horvat
Christine Horvat
Chris Gilbert
Vance Mansur
Dan Berkowitz
Dave Zittel
Steve Smith
David Warde
Rich Ice
Sallie Ahlert

Invited Guests
John Snow – University of Oklahoma
Rodger Brown – NSSL
Mike Jain - NSSL
Greg Stumpf - NSSL
Jami Boettcher – WDTB
Joe Baalke - WDTB
Kurt Hondl - WDTB
Bob Macemon - ORDA/RSIS
Betty Bennett - Lincoln Lab
Dave Smalley - Lincoln Lab

Attachment 1